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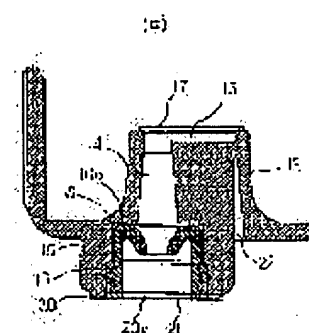
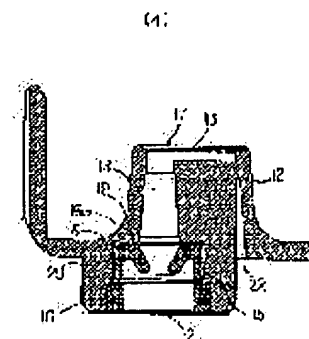
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(54) INK CARTRIDGE FOR INK-JET TYPE RECORDING APPARATUS, AND ITS MANUFACTURE

(57)Abstract:

PROBLEM TO BE SOLVED: To surely prevent generation of air bubbles at an ink feed opening by forming a ring-shaped thin rib at an upper face of a packing and shutting a space between a through hole and an outer side part of the packing in an ink cartridge including a film for sealing the ink feed opening.

SOLUTION: An adhesive 19 having resistive properties to ink is applied to an upper face at the side of a projecting part 12 to fill a space S to a container main body perfectly. A pressing member 20 having a window 20a allowing an ink feed needle to pass through is brought in elastic touch with a lowerend of a packing 16 and, thermally welded to the container main body. The packing 16 is inserted while a rib 16b of the packing 16 is elastically deformed to a widened part 15. By the adoption of the method, the space S being present between a side part of the packing 16 and the widened part 15 is shut not to communicate with a through hole 14. A notches part 22 is also provided at a gap to a bottom part of the main body, thereby securing a space even when the ink cartridge is tightly sealed in a package bag or the like.



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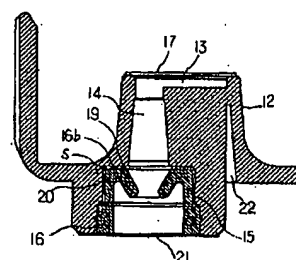
(54) 【発明の名称】 インクジェット式記録装置用インクカートリッジ、及びその製造方法

(57) 【要約】

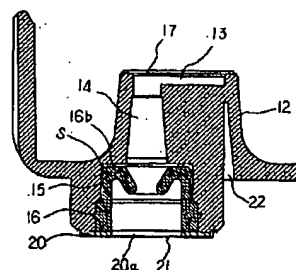
【課題】 インク供給口近傍での気泡の発生を防止すること。

【解決手段】 パッキン16の上面16aにリング状の細いリブ16bが形成して、通孔14とパッキン16の外側部の空間Sを確実に遮断する。

(イ)



(ロ)



【特許請求の範囲】

【請求項1】 インクを吸収するのに適した弾性材料からなる多孔質体を収容するフォーム室を備え、フォーム室の下端に記録ヘッドのインク供給針と係合するインク供給口が設けられた容器本体と、前記容器本体の開口を封止するインク注入口を備えた蓋体と、前記フォーム室の前記多孔質体側に形成され、先端にフィルター材が貼着された凹部を備え、前記凹部から前記インク供給口まで延びる通孔が穿設され、前記蓋体と協同して前記多孔質体を圧縮する凸部と、前記通孔の外端に形成された拡大部に嵌装されたパッキンと、前記インク供給口を封止するフィルムとからなるインクカートリッジにおいて、パッキンが上面にリング状の細いリブが形成されているインクジェット式記録装置用インクカートリッジ。

【請求項2】 前記パッキンが耐インク性を備えた接着剤の層を介して前記拡大部に装填されている請求項1に記載のインクジェット式記録装置用インクカートリッジ。

【請求項3】 前記パッキンが、インク供給針の挿通が可能な窓を備えた押圧部材を、パッキンの下端に弾接させて前記容器本体に熱溶着して前記リブを拡大部に弾性変形させて嵌装されている請求項1に記載のインクジェット式記録装置用インクカートリッジ。

【請求項4】 前記インク供給口を封止するフィルムが、気体透過性が高く、水分透過性が低い低密度ポリエチレンフィルムにより構成されていて、デッドスペースを形成するようにして遮気性フィルムに減圧状態で封入されている請求項1に記載のインクジェット式記録装置用インクカートリッジ。

【請求項5】 前記デッドスペースが前記容器本体に設けられた肉盛り部により形成されている請求項4に記載のインクジェット式記録装置用インクカートリッジ。

【請求項6】 少なくとも前記凸部の凹部、及び通孔の表面に親水性処理が施されている請求項1に記載のインクジェット式記録装置用インクカートリッジ。

【請求項7】 少なくともインクを吸収する弾性材料からなる多孔質体を収容するフォーム室を備え、底面にインク供給口が形成され、さらに上部が開口されたほぼ直方体の容器本体を用意し、底面を上部とするようにパレットにセットする工程と、前記インク供給口にパッキンを挿入して、前記インク供給口に封止用フィルムを熱溶着する工程と、容器本体を上下反転させて前記パレットに再セットする工程と、前記インク供給口に連通する流入側側にフィルター材を固定する工程と、前記フォーム室に多孔質材を圧縮状態となるように挿入する多孔質材圧入工程と、インク注入口、大気連通口、及び表面に前記大気連通口に接続する細溝が形成された蓋材を前記容器本体の開口

部に接着して容器を形成する蓋材接着工程と、前記容器を減圧環境下に収容して規定量のインクを前記フォーム室に注入するインク注入工程と、前記蓋材の表面の少なくとも前記インク注入口、及び前記細溝の領域を覆うように遮気性フィルムを接着する封止工程と、からなるインクジェット式記録装置用インクカートリッジの製造方法。

【請求項8】 前記インク注入工程においてインクが室温よりも10乃至20℃以上となるように加温される請求項7に記載のインクジェット式記録装置用インクカートリッジの製造方法。

【請求項9】 前記遮気性フィルムの溶着前に、大気圧に対して200mmHg以下の負圧で再脱気する工程を含む請求項7に記載のインクジェット式記録装置用インクカートリッジの製造方法。

【請求項10】 再脱気後、72時間以内に減圧環境下で開口近傍を熱溶着して密封する工程とを含む請求項7に記載のインクジェット式記録装置用インクカートリッジの製造方法。

【発明の詳細な説明】

【0001】

【発明が属する技術の分野】本発明は、キャリッジにインクジェット式記録ヘッドとインクカートリッジを搭載し、インクの補給をカートリッジの交換により行うインクジェット式記録装置のインクカートリッジに関する。

【0002】

【従来の技術】インクジェット式記録ヘッドを搭載したキャリッジにインク収容体を搭載する形式のインクジェット式プリンタにあつては、キャリッジの移動によるインクの揺動に起因する水頭圧の変動や、泡立ちによる印字不良を防止するために、欧州公開特許公報581531号公報に記載されたようにインク収容容器を2つの領域に分割し、記録ヘッド側に多孔質体を収容し、また他方の領域にインクを収容するようにしたものが提案されている。このような構造を採ると、記録ヘッドへのインクの供給が多孔質体を介して行なわれるため、インクの揺動に起因する不都合を防止することができる。

【0003】

【発明が解決しようとする課題】ところで、インクジェット式記録装置は、圧力発生室のインクを加圧してインク滴を発生させる関係上、インクに気泡が含まれていると、圧力が低下してインク滴の吐出性能も低下するため、溶存空気を排除したインクを多孔質体に注入することが行われている。一方、気密性を維持して記録ヘッドとの接続を確保するため、インク供給口には弾性部材からなるパッキンを嵌装されているが、パッキンとカートリッジ本体との間に微小な空間が存在し、この空間の空気が膨張して記録ヘッドに流入してインク吐出に不都合を来すという問題がある。本発明の第1の目的は、イン

ク供給口に残存する空気を確実に排除することができるインクジェット式記録装置のインクカートリッジを提供することである。

【0004】一方、このようなインクカートリッジは、記録ヘッドに装填されるまでインクに気泡を発生させることなく、しかも脱気状態を維持する必要がある、また流通過程での品質を保証するための包装等が不可欠となり、複雑な製造工程を必要として生産性が低下するという問題を抱えている。本発明の第2の目的は、確実に脱気されたインクを充填したインクカートリッジを効率的に製造するための製造方法を提案することである。

【0005】

【課題を解決するための手段】このような問題を解消するために本発明においては、インクを吸収するのに適した弾性材料からなる多孔質体を収容するフォーム室を備え、フォーム室の下端に記録ヘッドのインク供給針と係合するインク供給口が設けられた容器本体と、前記容器本体の開口を封止するインク注入口を備えた蓋体と、前記フォーム室の前記多孔質体側に形成され、先端にフィルター材が貼着された凹部を備え、前記凹部から前記インク供給口まで延びる通孔が穿設され、前記蓋体と協同して前記多孔質体を圧縮する凸部と、前記通孔の外端に形成された拡大部に嵌装されたパッキンと、前記インク供給口を封止するフィルムとからなるインクカートリッジにおいて、パッキンが上面にリング状の細いリブが形成して、通孔とパッキンの外側部の空間を確実に遮断する。

【0006】

【発明の実施の形態】図1は、本発明の製造方法が対象とするインクカートリッジの一実施例を、シアン、マゼンタ、イエローの3種類のインクを収容するものについて示すものであって、図中符号1は、開口側が若干未広がりとするほぼ直方体の容器本体で、各部材との接合を熱溶着により行いやすくするために、ポリプロピレン、ポリエチレン、ポリスチレン等の高分子材料を射出成形して構成されている。

【0007】容器本体1は、仕切り板2、3、4よりインクを吸収するのに適した弾性材料からなる多孔質体5を収容するフォーム室6、6、6と、インクをそのまま収容するインク室7、7、7に分離されている。

【0008】各フォーム室6の下端には記録ヘッドのインク供給針と係合するインク供給口8が設けられ、また容器本体1の開口は、フォーム室6のインク供給口8の近傍に位置するように穿設されたインク注入口9、9、9と、大気連通口10、10、10を備えた蓋体11で封止されている。

【0009】各フォーム室6の底部には、多孔質体5を蓋体11と協同して圧縮するための凸部12が形成されていて、その上端に一定の開口面積を有する空室を形成する凹部13が形成され、この凹部13からインク供給

口8まで延びる通孔14が穿設されている。通孔14の外端には、記録ヘッドのインク供給針と液密に係合するように拡大部15を形成して、パッキン16が挿入されており、また凸部12の先端には凹部13を覆うようにフィルタ材17が貼着されている。

【0010】これらフィルター材18、凹部12、及び通孔14のインクと接する面は、紫外線を照射してインクに対する濡れ性を改善する処理が施されている。

【0011】またパッキン16は、図3に示したように面16aにリング状の細いリブ16bを形成して構成されており、図4（イ）に示したように凸部12側の上面16aに耐インク性を備えた接着剤19を塗布して容器本体1との間の空間Sを完全に埋めるように装填されている。また同図（ロ）に示したようにインク供給針の挿通が可能な窓20aを備えた押圧部材20を、パッキン16の下端に弾接させて容器本体1に熱溶着され、パッキン16のリブ16bを拡開部15に弾性変形させた状態でパッキン16が挿入されている。

【0012】このような手法を採ることによりパッキン16の側部と拡開部15との間に存在する空間Sと通孔14との連通を断つことができる。

【0013】このようにパッキン16を挿入して形成されたインク供給口8の先端にはインク供給針の挿入により破損可能で、かつ好ましくは気体透過性が高く、水分透過性が低い低密度ポリエチレンフィルム等からなる遮気性フィルム21が貼着され、また容器本体1の底部1aとの間には肉盗み部22を設けて、包装袋等に密閉された場合にも内部に空間を確保できるように構成されている。

【0014】蓋体11の表面には、図5（イ）に示したように一端が大気連通口10に連通し、また他端が蓋体11の他側に延びる蛇行した溝23、23、23が形成され、図5（ロ）に示したようにインク注入口9、大気連通口10、及び溝23を覆うように、舌片24aの引き剥がしにより溝23の先端23aを大気に開放可能とするフィルム24が貼着されている。このフィルム24は、気体透過性が高く、水分透過性が低い低密度ポリエチレンフィルム等の遮気性フィルムを使用するのが望ましい。

【0015】つぎに製造方法について説明する。図6は、製造工程中、容器本体を移送するためのパレットの一実施例を示すものであって、パレット30は、その表面に容器本体1の底面1aの外周が填まり込む位置と、開口1bの内面が填まり込む位置のそれぞれ少なくとも4本ずつのピン31、及び32を植設し、またインク供給口8が対向する位置にはこれを収容できる凹部33を形成し、さらに周囲に後述するインク注入工程でシール部を形成する段差部34を形成して構成されている。

【0016】先ず、予め射出成形により形成された容器本体1（図7（I））を底面1aが上方となるように開

口部1bをピン31に位置合わせしてパレット30にセットし、先端に耐インク性を備えた接着剤を薄く塗布したパッキン16をインク供給口8に仮圧入し、次いで中心を軸にして押込み治具40を回転させて摩擦を低減させながら所定位置まで圧入する(図7(II))。このようにねじれを与えながら圧入すると、パッキン16は、周縁等の端部領域のみめくれ上がりや、ねじれを起こすことなくインク供給口8に嵌合されるため、装填後にパッキン16がインク供給口8からの飛び出しを確実に防止でき、また容器本体1との間のすき間を接着剤で埋めることができる。

【0017】またパッキン16をインクに浸漬してインクを付着させてから、上述と同様に装填し、前述したようにインク供給針の挿通が可能な窓20aを備えた押圧部材20を、パッキン16の下端に弾接させて容器本体1に熱溶着することにより、後述するインク充填工程でインクが進入し難い空間20(図4)に予めインクを注入して、パッキン16の外側側面と拡張部15との間の空間とインク供給口8とを遮断することができる。

【0018】熱溶着性材料からなる遮気性フィルム21をインク供給口8を覆うようにセットし、治具41によりインク供給口8の周囲を加熱、加圧して、インク供給口8をフィルム21により封止し(図7(III))、必要に応じて底面1aや側面1cにロット番号や有効期限を印刷したり、刻印する。

【0019】容器本体1の底面1aに対する全ての作業が終了した段階で、容器本体1を天地返して容器本体1の開口部1bが上方となるように容器本体1をパレット30に再セットする。

【0020】インク供給口8と通口により通る凸部12に形成されている凹部13の幅よりも若干大きめの幅を有するフィルタとなる不銹鋼のメッシュ材や不織布等のフィルター材のテープを、長手方向に対して斜め方向に所定のサイズに切断してフィルター材17を形成し、これを凹部13を覆うようにセットし、セット後に容器本体1が若干軟化する程度に治具42により加熱、加圧して熱溶着する(図8(I))。不銹鋼のワイヤを織ってフィルター材17のテープが構成されている場合には、縦糸及び横糸となるワイヤの方向に対して非平行となるように切断することにより、ほつれを防止することができる。

【0021】ほつれの発生を皆無とすると次のような効果がある。すなわち、フィルター材17を構成するワイヤがパッキン16の領域に浸入すると、カートリッジを記録ヘッドに装着する際に記録ヘッドのインク供給針とパッキン16との間にワイヤが挟まり込み、これに起因して記録ヘッドのインク供給針とカートリッジとの気密性の保持が低下して外部からの空気の浸入を許して記録ヘッドへのインクの供給に支障を来すという問題を生じることがある。ほつれを無くするとこの問題を確実に回避するこ

とができる。

【0022】また、フィルター材17が固定される凸部12の形状、通常円形、もしくは楕円形に一致させてフィルター材をプレスで打ち抜き加工する整形方法に比較して、上述のようにテープ材を斜めカットする整形方法を探ると、ワイヤのほつれ防止の他にテープ材の有効利用を図ることができる。

【0023】ついで、多孔質体5の圧入工程に移る。図9(イ)、(ロ)は、それぞれ多孔質材挿入装置、及び多孔質材挿入工程の一実施例を示すものであって、多孔質材挿入装置は、図9(イ)に示したように櫛歯状に形成されて、対向方向に移動可能な圧縮部材43、43と、これの間に位置して上下動可能な押圧部材44とから構成されている。

【0024】圧縮部材43、43を水平方向に移動させて多孔質材5を挟み(図9(ロ)I)、圧縮部材43、43の外端の幅がフォーム室6の内幅よりも小さくなるまで圧縮部材43、43を押圧部材44側に移動させて多孔質材5をその幅がフォーム室6の幅よりも小さくなるように圧縮する(図9(ロ)II)。

【0025】ついでフォーム室6に移動して2本の圧縮部材43、43の間の押圧部材44を容器本体1側に移動させて多孔質材5を上端からフォーム室6に押込む(図9(ロ)III)。ついで押圧部材44を若干さらに降下させてから、容器1を多孔質挿入装置から待避させる。

【0026】これにより、図8(II)に示したようにフォーム室6の容積よりも若干大きく形成された多孔質材5が圧縮された状態でフォーム室6にセットされる。

【0027】ついで容器本体1の開口部1bに蓋材11を位置決めし、所定の圧力で蓋部材11を容器本体1に押圧しながら開口部1bを含む平面内で治具45を介して蓋材11の平面を含む方向、または垂直な方向、さらには斜め方向の何れか、または組み合わせた方向に超音波振動を加えて、容器本体1の開口部1bと蓋材11の裏面とを摩擦溶融させて接着する(図8(III))。

【0028】溶着後、容器本体1、及び蓋材11を構成する材料を軟化させるに足る温度に加熱した加熱棒46を接合部の周囲に当接させたり、また噴射ノズル47から熱風を噴射して接合時により生じたバリ等を除去する(図10)。

【0029】このようにして容器が完成した段階で、インク注入ステーションに移動する。図11はインク注入装置の一実施例を示すものであって、図中符号50は、パレット30を保持する受台で、図示しない駆動機構により矢印Aで示すように上下動可能に構成されている。51は、基台で、貫通口を備え、下面をパレット30の周囲の段差部34とにより、また上面を後述する蓋部材52とにより注入室53を形成し、また流路54により真空ポンプ55に接続されている。

【0030】52は、前述の蓋部材で、注入室53に対向する領域に通路56が穿設され、ここに気密状態を保持しながら図中矢印Bで示したように上下動可能なピストン部材57が挿入されている。

【0031】ピストン部材57は、注入室53にセットされた容器1のインク注入口9に対向する位置に注入針58と、容器1の大気連通路10に対向するように図示しない給気装置に連通する流路60を設けて構成されている。また注入針58は、流路59、チューブ61を介して分岐管62に接続されている。

【0032】63は、気液分離ユニットで、この実施例では中空系束64を液流路とするように上端と下端をシリンダ65に液密に固定し、またシリンダ65を真空ポンプ66に接続して中空系の外周に負圧を作用させるように構成され、シリンダ65の一端がチューブ67によりインクタンク68に接続され、また他端が止弁69を介して分岐管62に接続されている。

【0033】70は、計量管で、シリンダ71とピストン72とにより構成され、上死点側がチューブ73により分岐管62に接続されている。なお、図中符号74は止弁を、また75はインク圧送用のポンプをそれぞれ示す。

【0034】前述の工程により各部材の組み付けが終了した容器1を載せたパレット30がインク注入装置に到達して、注入室53の下方にセットされると(図12

(I))、受台50が基台51の下面に密着するまで上昇する(図12(II))。

【0035】ついでピストン56を容器1の蓋部材11との間に空間が確保できる程度まで降下させて、また気液分離ユニット63に連通する止弁68を開弁状態に維持したまま止弁74を開弁して、真空ポンプ55を作動させて注入室53、チューブ61、73、及び計量管70を所定の圧力まで減圧する(図13(I))。

【0036】所定の圧力まで減圧が進行した段階で、止弁74を開弁し、また止弁68を開弁して所定量のインク7を計量管63に注入し(図13(II))、これに併行してピストン部材57を下死点まで降下させる。これによりピストン部材47の下端の各パッキン77、78が容器1のインク供給口10、及び大気連通路10に弾接し、また注入針58が容器1の底面近傍まで進入する。

【0037】この挿入過程においては、好ましくは注入針58がフィルタ17の直上に位置させると、フィルタ17、凹部13、通孔14、パッキン16に気泡を残留させることなくインクを確実に充填することができる。そして、インク注入針のインク噴出口を放射状に形成することにより、多孔質材5全体に均等にインクを吸収させることができる。

【0038】また計量管70に接近して気液分離ユニット63が接続されているため、計量管70には気液分離

ユニット63で脱気された直後のインクが流入する。

【0039】ついで、止弁69を開弁して気液分離ユニット63と遮断した状態で、止弁74を開弁して計量管70のピストンを押圧して所定量のインクを排出すると、容器1には所定量のインクが注入される(図14))。

【0040】このとき、気液分離ユニット60により確実に脱気されたインクが多孔質体5に注入されるため、インクは、上述の減圧工程(図13(I))では排出しきれなかった多孔質体5の細孔内に吸着されている気体を容易に溶解させて多孔質材5内に気泡を発生させたりまた残留させることなく、多孔質体5に均一に吸収される。

【0041】特に止弁74とインク注入針58を接続するチューブ61を、インク注入期間中、室温よりも温度が10乃至20℃程度上昇するように加熱すると、インクの粘度が低下して多孔質体5の細孔に確実に進入させることができる。

【0042】これにより、インクの注入が終了した時点では、少なくとも多孔質材5には気体が存在しなくなるため、気泡を含むことがなく、印字品質を保証することができる。

【0043】インクの注入が終了した段階で、排気口60を大気に開放して多孔質材5の上部に残ったインクを大気圧との差圧により多孔質材5に完全に吸収させる。その後、受台50を降下させ、パレット40を次の工程に移動させてインク注入口9等に付着しているインクを真空吸引や布等で拭き取り、最後にインク注入口9に導管を当接させて微小な正圧を作用させて、蓋体11の裏に付着しているインクを多孔質体5側に拭き落とす。

【0044】容器1を大気連通路10が上方となるように傾けて減圧容器に収容して、少なくとも大気連通路10、インク注入口9、及び細溝23を覆う程度のサイズに切断された遮気性フィルム24を治具80により熱溶着により仮止する(図15)。この際、温度上昇により容器1内の圧力が上昇したとしても、大気連通路10が可及的に上方に位置するから、膨張した空気は、大気連通路10から速やかに排出されてインク注入口9からのインクの漏洩を防止することができる。

【0045】次いで溝19を覆う領域を加熱してフィルム24の一半を溶着し、また他半の要部を引き剥がし可能な程度に溶着して、細溝19とフィルム24によりキャピラリを形成する。フィルム24の他半を貼着する以前にインクカートリッジを脱気室に収容して再脱気する場合には、その減圧値を200mmHg程度に抑え、と、パッキン16により生じたフィルタ17よりもインク供給口近傍に残留する、気泡の発生核の物理的成長を抑えつつカートリッジを再減圧することができ、またインク注入口からのインクの噴出を抑え、インクカートリッジに可及的に多くのインクを充填することができる。

【0046】このようにして完成したインクカートリッジ70は、図16に示したように少なくともインク供給口8のシール16を破損しないように少なくともインク供給口8に緩衝材81を当接させ、かつ遮気フィルム24の舌片24aを折り畳んだ上、遮気性フィルムにより構成された襜83a付きの袋83に挿入する。

【0047】そして開口部近傍の襜83aを内側に折り畳んで均等な厚みに成形した上で、減圧環境下で開口近傍を熱溶着して密封すると(図17(イ))、インク供給口8の近傍に設けられている肉盗み部22が袋83との間で減圧空間を形成する。一方、インク供給口8を封止するフィルム21をガス透過性が高く、かつ水分透過性が低い低密度ポリエチレンフィルム等により構成しておく、インク供給口近傍のインクに溶存している空気だけがフィルム21を透過して肉盗み部22が袋83とで形成された減圧空間に排出される。これによりインク供給口近傍のインクの空気溶存度を可及的に低下させて記録ヘッドへの気泡の流入を防止することができる。

【0048】また、インク供給口8を封止するフィルム21、及び蓋体11のインク注入口9、排気口10、及び溝23を封止するフィルム24を気体透過性が高く、水分透過性が低い低密度ポリエチレンフィルム等の遮気性フィルムにより構成することにより、カートリッジのインク全体の溶存空気量を可及的に低減して、記録ヘッドでの気泡の発生を確実に防止することができる。望ましくは、再脱気後、72時間以内に袋83に封入するのが望ましい。

【0049】特に、記録ヘッドに初めてインクを充填する場合には、記録ヘッド内の気泡を確実にインクに溶解させて排除する必要上、カートリッジのインクをマイナス300mmHg程度の脱気度に維持しておくのが望ましい。このようにインクに高い脱気度を維持させるためには容器の肉盗み部22の容積を大きくしたり、また袋83とカートリッジとの間に積極的にデッドスペースを形成する目的で、厚目の緩衝材81に凹部や通孔を設けたり、またスペーサを同封して封止するのが望ましい。

【0050】最後にケース84に納めて商品に仕上げる(図17(ロ))。記録装置本体の付属品として同梱するインクカートリッジは、当該記録装置の記録ヘッドに最初に装着されるインクカートリッジであるから、前述した高い脱気度のインクを充填したものを選択し、また、サプライ用には脱気度が若干低いインクカートリッジを供給するのが望ましく、これら2種類のカートリッジを簡単に区別できるように、ケース84を記号や色で区別できるように構成しておく。

【0051】なお、上述の実施例においてはインク室を備えたカートリッジに例を採って説明したが、図18に示したように容器1に多孔質材5を充填して、この多孔質材5にだけインクを収容するカートリッジ85の製造にも適用できることは明らかである。

【0052】また、は図19に示したように小型のカートリッジ86にあつてインク注入口と大気開放口とを兼用する1つの開口87だけが形成されているが、このような場合には、図20に示したようにインク注入針58と、排気装置に連通する流路60とを同軸に配置することにより、カートリッジ85の1つの開口87をインク注入作業と排気作業とに同時に利用することができる。

【0053】

【発明の効果】以上説明したように本発明においては、インクを吸収するのに適した弾性材料からなる多孔質体を収容するフォーム室を備え、フォーム室の下端に記録ヘッドのインク供給針と係合するインク供給口が設けられた容器本体と、容器本体の開口を封止するインク注入口を備えた蓋体と、フォーム室の多孔質体側に形成され、先端にフィルター材が貼着された凹部を備え、凹部からインク供給口まで延びる通孔が穿設され、蓋体と協同して多孔質体を圧縮する凸部と、通孔の外端に形成された拡大部に嵌装されたパッキンと、インク供給口を封止するフィルムとからなるインクカートリッジにおいて、パッキンの上面にリング状の細いリブが形成したので、通孔とパッキンの外側部の空間を確実に遮断して、インク供給口近傍での気泡の発生を確実に防止することができる。

【0054】また、本発明においては、少なくともインクを吸収する弾性材料からなる多孔質体を収容するフォーム室を備え、底面にインク供給口が形成され、さらに上部が開口されたほぼ直方体の容器本体を用意し、底面を上部とするようにパレットにセットする工程と、インク供給口にパッキンを挿入してインク供給口に封止用フィルムを熱溶着する工程と、容器本体を上下反転させてパレットに再セットする工程と、インク供給口に連通する流入側側にフィルタ材を固定する工程と、フォーム室に多孔質材を圧縮状態となるように挿入する多孔質材圧入工程と、インク注入口、大気連通口、及び表面に大気連通口に接続する細溝が形成された蓋材を容器本体の開口部に接着して容器を形成する蓋材接着工程と、容器を減圧環境下に収容して規定量のインクをフォーム室に注入するインク注入工程と、蓋材の表面の少なくとも前記インク注入口、及び細溝の領域を覆うように遮気性フィルムを接着する封止工程とを備えたので、パレットをそれぞれの工程に移送することにより、効率的に製造することができる。

【図面の簡単な説明】

【図1】本発明の対象となるインクカートリッジの一実施例を示す組立斜視図である。

【図2】図(イ)、(ロ)は、それぞれ同上インクカートリッジの一実施例を示す断面図である。

【図3】図(イ)、(ロ)は、それぞれパッキンに一実施例を示す上面図と断面図である。

【図4】図(イ)、(ロ)は、それぞれインク供給口の

一実施例を拡大して示す断面図である。

【図５】図（イ）、（ロ）は、それぞれインクカートリッジの蓋体の構造を、フィルムを取り去って示す図と、フィルムを貼着した状態で示す図である。

【図６】容器を保持、搬送するパレットの一実施例を示す図である。

【図７】図（Ⅰ）（Ⅱ）（Ⅲ）は、それぞれインクカートリッジ形成工程の内の初期の工程を示す図である。

【図８】図（Ⅰ）（Ⅱ）（Ⅲ）は、それぞれインクカートリッジ形成工程の内の中期の工程を示す図である。

【図９】図（イ）は、多孔質材挿入装置の一実施例を、及び図（ロ）の（Ⅰ）乃至（Ⅲ）はそれぞれ多孔質材の容器本体への挿入工程を示す図である。

【図１０】カートリッジの外形形状の整形工程を示す図である。

【図１１】インク注入装置の一実施例を示す構成図である。

【図１２】図（Ⅰ）（Ⅱ）は、それぞれインク注入工程の内の初期の工程を示す図である。

【図１３】図（Ⅰ）（Ⅱ）は、それぞれインク注入工程の内の中期の工程を示す図である。

【図１４】インク注入工程の最後の工程を示す図であ

る。

【図１５】遮気性フィルムの貼着工程を示す図である。

【図１６】包装工程の内の前半の工程を示す図である。

【図１７】包装工程の内の後半の工程を示す図である。

【図１８】本発明の製造方法が適用可能なインクカートリッジの他の実施例を示す図である。

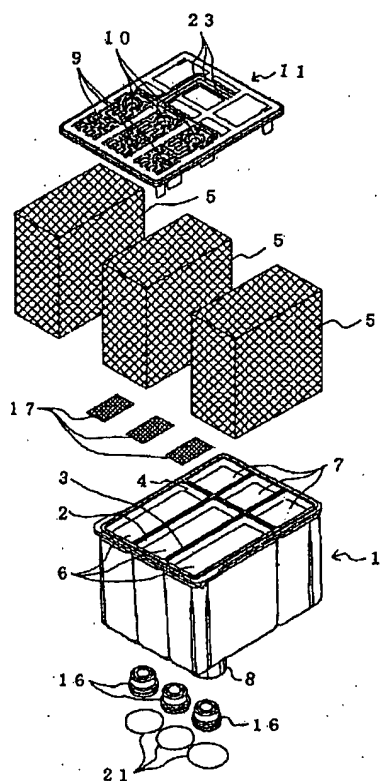
【図１９】本発明の製造方法が適用可能なインクカートリッジの他の実施例を示す図である。

【図２０】同上インクカートリッジに適したインク注入装置の他の実施例を示す図である。

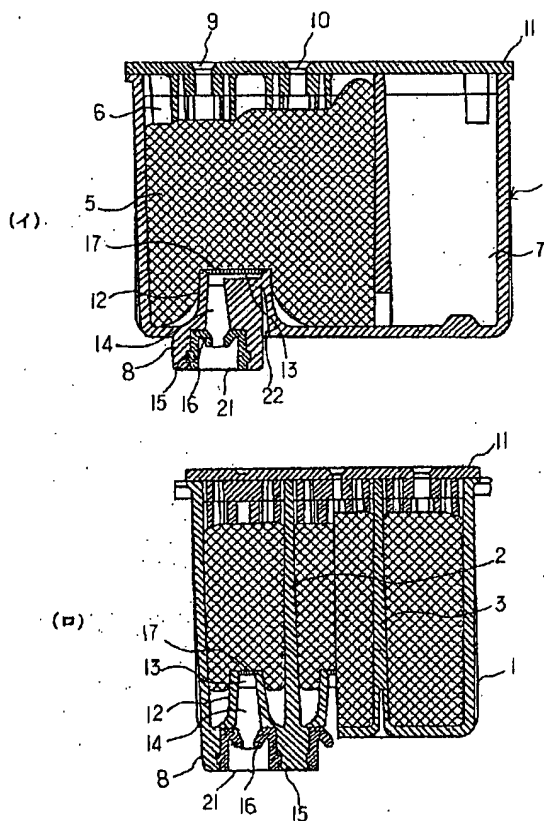
【符号の説明】

- １ 容器本体
- ５ 多孔質体
- ６ フォーム室
- ７ インク室
- ８ インク供給口
- ９ インク注入口
- １０ 大気連通口
- １１ 蓋材
- １６ パッキン
- １６ｂ リング状リップ
- Ｓ 空間

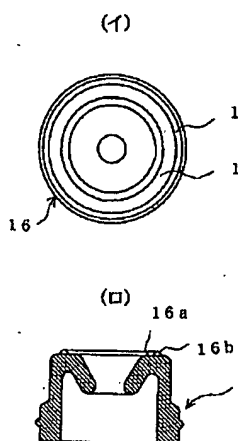
【図１】



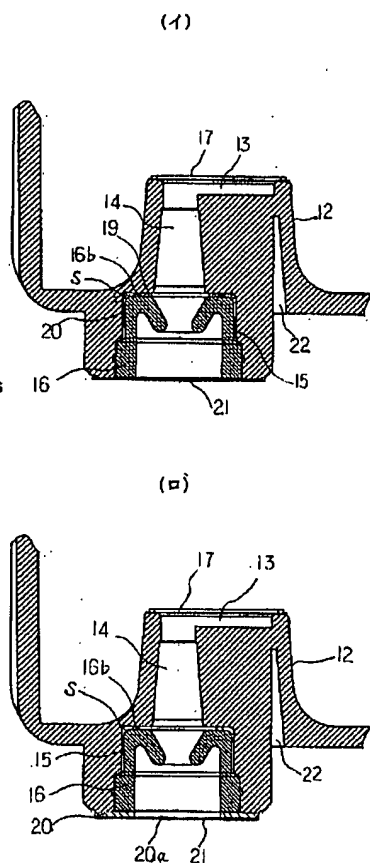
【図２】



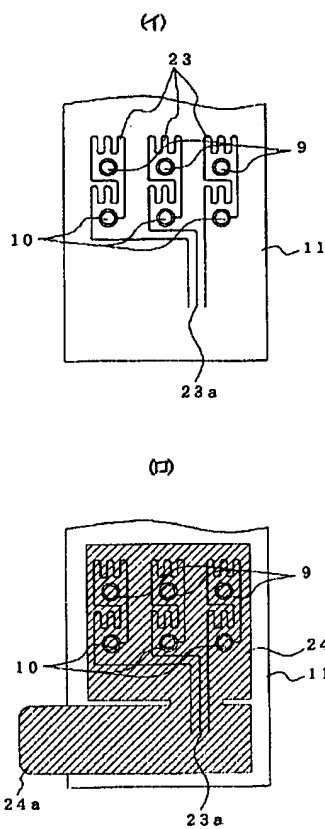
【図3】



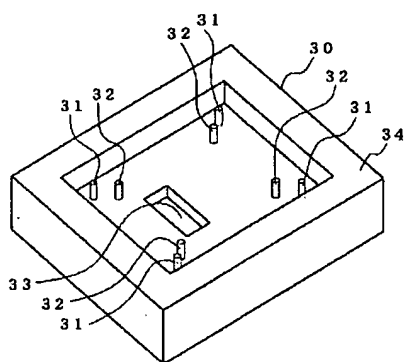
【図4】



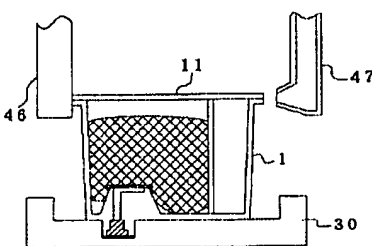
【図5】



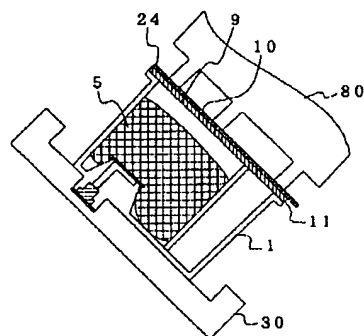
【図6】



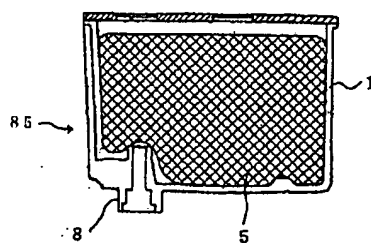
【図10】



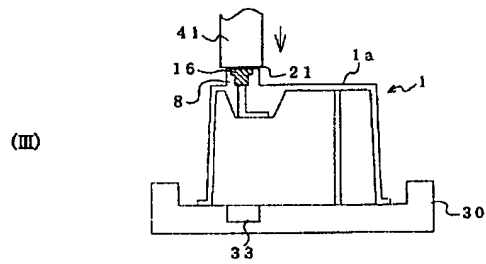
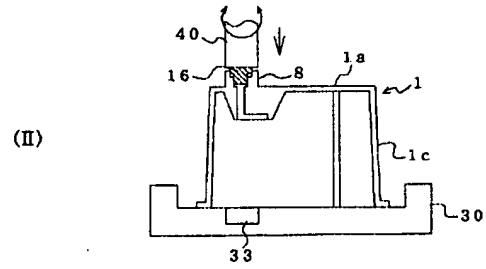
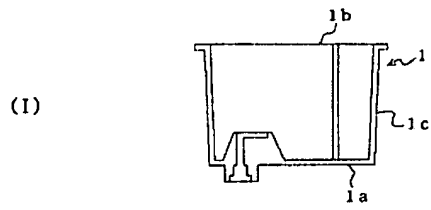
【図15】



【図18】

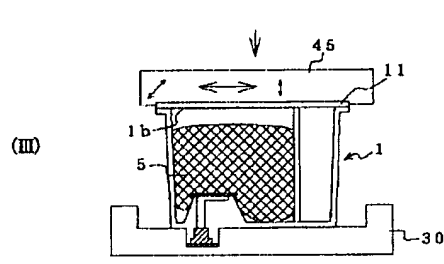
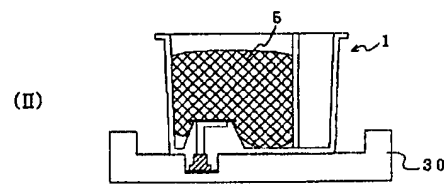
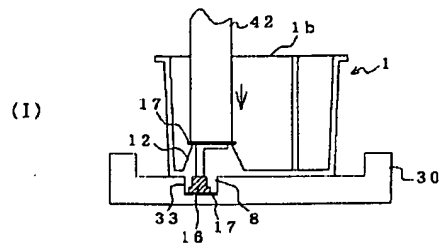


【図 7】



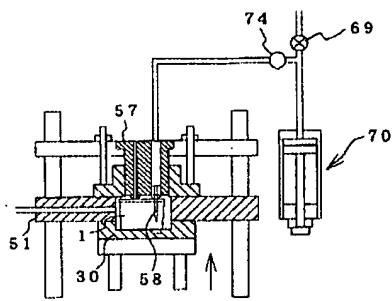
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【図 8】

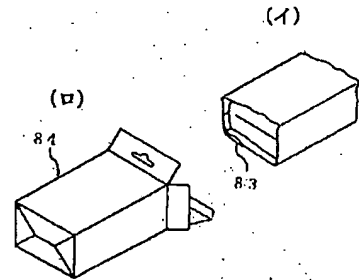
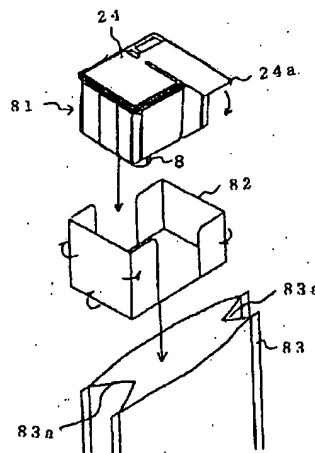
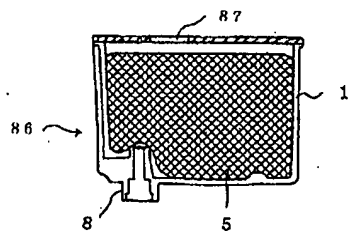


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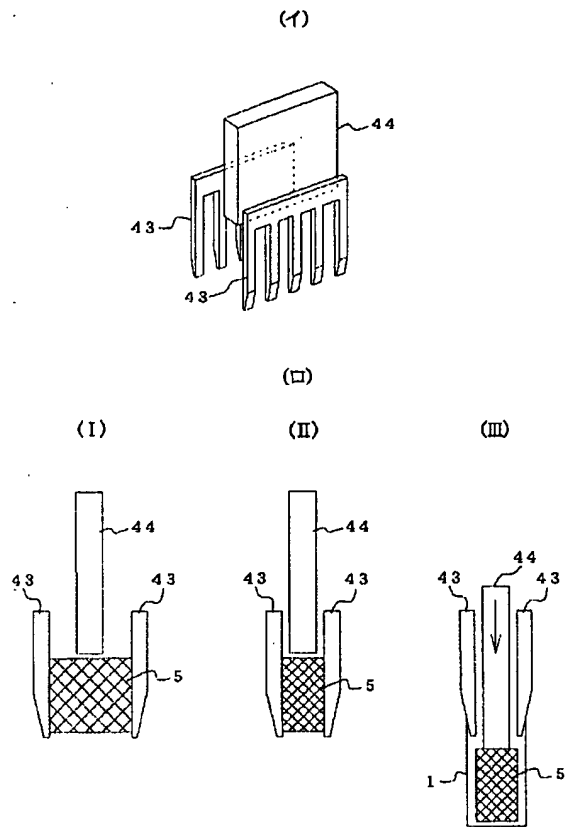
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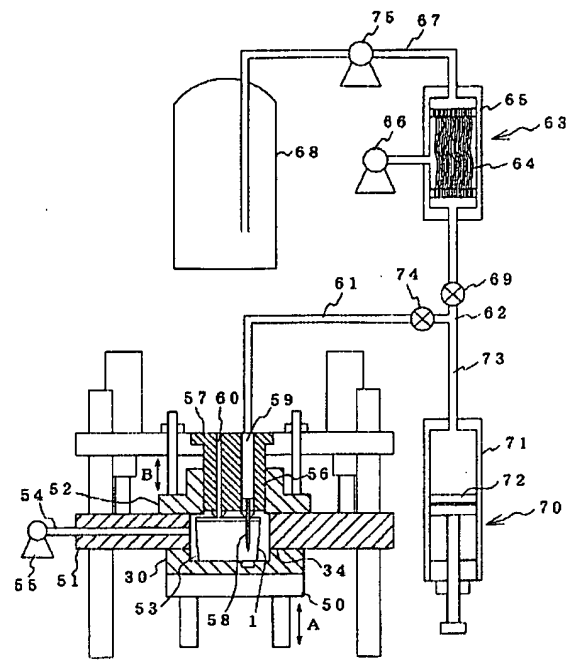
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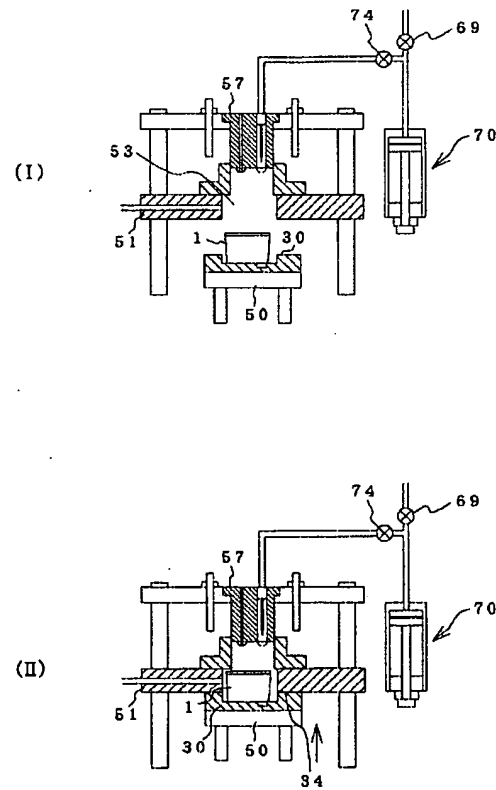
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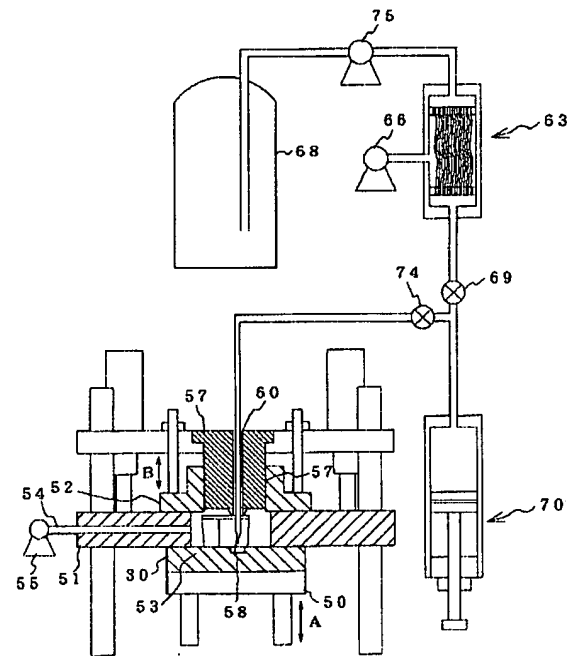
【図11】



【図12】



【図 20】



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CLAIMS

[Claim(s)]

[Claim 1] The body of a container with which it had the form room in which the porous body which consists of a spring material suitable for absorbing ink is held, and the ink feed hopper which engages with the ink supply needle of a recording head was prepared in the lower limit of a form room, It is formed in said equipped with ink inlet which closes opening of said body of container lid, and porous body side of said form room. The heights which it has the crevice where the filter material was stuck at the tip, and the through-hole prolonged from said crevice to said ink feed hopper is drilled, and compress said porous body in cooperation with said lid, The ink cartridge for ink jet type recording apparatus by which the thin ring-like rib is formed in the top face for packing in the ink cartridge which consists of packing fitted in the limb formed in the outer edge of said through-hole, and a film which closes said ink feed hopper.

[Claim 2] The ink cartridge for ink jet type recording apparatus according to claim 1 by which said extension section is loaded with said packing through the layer of adhesives equipped with ink-proof nature.

[Claim 3] The ink cartridge for ink jet type recording apparatus according to claim 1 in which make the press member equipped with the aperture which can insert in an ink supply needle **** to the lower limit of packing, and said packing carries out heat welding, makes the extension section carry out elastic deformation of said rib to said body of a container, and is fitted.

[Claim 4] The ink cartridge for ink jet type recording apparatus according to claim 1 enclosed with the ***** film in the state of reduced pressure as permeability is high, is constituted by the low consistency polyethylene film with low moisture permeability and the film which closes said ink feed hopper forms dead space.

[Claim 5] The ink cartridge for ink jet type recording apparatus according to claim 4 currently formed of the meat theft section by which said dead space was prepared in said body of a container.

[Claim 6] The ink cartridge for ink jet type recording apparatus according to claim 1 by which hydrophilic processing is performed at least to the crevice of said heights, and the front face of a through-hole.

[Claim 7] It has the form room in which the porous body which consists of a spring material which absorbs ink at least is held. The process to which the ink feed hopper was formed in the base and opening of the upper part was carried out further and which is set to a pallet so that the body of a container of a rectangular parallelepiped may be prepared mostly and a base may be made into the upper part, The process which inserts packing in said ink feed hopper, and carries out heat welding of the film for the closures at said ink feed hopper, The process which is made to carry out vertical reversal of the body of a container, and is re-set to said pallet, and the

process which fixes a filter material to the input side which is open for free passage to said ink feed hopper, The porosity material press fit process which inserts porosity material in said form room so that it may be in a compression condition, An ink inlet, atmospheric-air free passage opening, and the lid material adhesion process that pastes up the lid material by which the rill linked to said atmospheric-air free passage opening was formed in the front face on opening of said body of a container, and forms a container, The ink impregnation process of holding said container in the bottom of a reduced pressure environment, and pouring the ink of the amount of conventions into said form room, the front face of said lid material -- at least -- said ink inlet and the field of said rill -- a wrap -- the closure process which pastes up a ***** film like -- since -- the becoming manufacture approach of the ink cartridge for ink jet type recording apparatus.

[Claim 8] The manufacture approach of the ink cartridge for ink jet type recording apparatus according to claim 7 warmed so that ink may become 10 thru/or more than 20-degreeC from a room temperature in said ink impregnation process.

[Claim 9] The manufacture approach of the ink cartridge for ink jet type recording apparatus including the process re-deaerated with the negative pressure of 200 or less mmHgs to atmospheric pressure before joining of said ***** film according to claim 7.

[Claim 10] The manufacture approach of the ink cartridge for ink jet type recording apparatus including the process which carries out heat welding and seals near the opening under a reduced pressure environment within 72 hours after re-degassing according to claim 7.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The field of the technique in which invention belongs] This invention carries an ink jet type recording head and an ink cartridge in carriage, and relates to the ink cartridge of an ink jet type recording apparatus which supplies ink by exchange of a cartridge.

[0002]

[Description of the Prior Art] If it is in the ink jet printer of the format of carrying an ink hold object in the carriage which carried the ink jet type recording head In order to prevent fluctuation of the head resulting from rocking of the ink by migration of carriage, and poor printing by foaming What divides an ink hold container into two fields as indicated by the Europe public presentation patent official report No. 581531 official report, holds a porous body in a recording head side, and held ink in the field of another side is proposed. If such structure is taken, since supply of the ink to a recording head will be performed through a porous body, it can prevent un-arranging resulting from rocking of ink.

[0003]

[Problem(s) to be Solved by the Invention] By the way, on the relation which an ink jet type recording device pressurizes [relation] the ink of a pressure generating room, and generates an ink droplet, if air bubbles are contained in ink, since a pressure will decline and the discharging performance of an ink droplet will also fall, pouring into a porous body the ink which eliminated dissolved air is performed. Although packing which consists of an elastic member is fitted in by the ink feed hopper on the other hand in order to maintain airtightness and to secure connection with a recording head, minute space exists between packing and a cartridge body, and there is a problem of the air of this space expanding, flowing into a recording head, and causing un-arranging to the ink regurgitation. The 1st purpose of this invention is offering the ink cartridge

of the ink jet type recording apparatus which can eliminate certainly the air which remains in an ink feed hopper.

[0004] On the other hand, without making ink generate air bubbles until a recording head is loaded, the package for maintaining a degassing condition moreover and guaranteeing the quality in a circulation process etc. becomes indispensable, and such an ink cartridge has the problem that need a complicated production process and productivity falls. The 2nd purpose of this invention is proposing the manufacture approach for manufacturing efficiently the ink cartridge filled up with the ink by which degassing's was carried out certainly.

[0005]

[Means for Solving the Problem] In order to solve such a problem, it sets to this invention. The body of a container with which it had the form room in which the porous body which consists of a spring material suitable for absorbing ink is held, and the ink feed hopper which engages with the ink supply needle of a recording head was prepared in the lower limit of a form room, It is formed in said equipped with ink inlet which closes opening of said body of container lid, and porous body side of said form room. The heights which it has the crevice where the filter material was stuck at the tip, and the through-hole prolonged from said crevice to said ink feed hopper is drilled, and compress said porous body in cooperation with said lid, In the ink cartridge which consists of packing fitted in the limb formed in the outer edge of said through-hole, and a film which closes said ink feed hopper, a thin ring-like rib forms in a top face, and packing intercepts the space of a through-hole and the lateral part of packing certainly.

[0006]

[Embodiment of the Invention] what hold cyanogen , a Magenta , and three kinds of ink of yellow for one example of the target ink cartridge [drawing 1 / approach / of this invention / manufacture] be show , an opening side carry out injection molding of the polymeric materials , such as polypropylene , polyethylene , and polystyrene , in order [which serve as breadth at last a little] to make junction to each part material easy to be the body of a container of a rectangular parallelepiped mostly , and for heat joining to perform , and the sign 1 in drawing be constitute .

[0007] The body 1 of a container is separated into the form rooms 6, 6, and 6 in which the porous body 5 which consists of a spring material suitable for absorbing ink is held, and the ink rooms 7, 7, and 7 in which ink is held as it is from diaphragms 2, 3, and 4.

[0008] The ink feed hopper 8 which engages with the ink supply needle of a recording head is formed in the lower limit of each form room 6, and the closure of the opening of the body 1 of a container is carried out with the lid 11 equipped with the ink inlets 9, 9, and 9 drilled so that it might be located near the ink feed hopper 8 of the form room 6, and the atmospheric-air free passage openings 10, 10, and 10.

[0009] The crevice 13 which the heights 12 for compressing a porous body 5 in cooperation with a lid 11 are formed, and forms the vacant room which has a fixed opening area in that upper limit is formed in the pars basilaris ossis occipitalis of each form room 6, and the through-hole 14 prolonged from this crevice 13 to the ink feed hopper 8 is drilled in it. the outer edge of a through-hole 14 -- the ink supply needle of a recording head, and liquid -- a limb 15 is formed so that it may be engaged densely, and packing 16 inserts -- having -- **** -- moreover -- the tip of heights 12 -- a crevice 13 -- a wrap -- the filter material 17 is stuck like.

[0010] Processing which these filter materials 18, a crevice 12, and the field that touches the ink of a through-hole 14 irradiate ultraviolet rays, and improves the wettability to ink is performed.

[0011] Moreover, thin ring-like rib 16b is formed and packing 16 is constituted by field 16a, as shown in drawing 3 , and it is loaded with it so that the adhesives 19 which equipped top-face

16a by the side of heights 12 with ink-proof nature as shown in drawing 4 (b) may be applied and the space S between the bodies 1 of a container may be filled completely. Moreover, packing 16 is inserted where it makes the press member 20 equipped with aperture 20a which can insert in an ink supply needle **** to the lower limit of packing 16, and heat joining is carried out to the body 1 of a container, as shown in this drawing (b), and elastic deformation of the rib 16b of packing 16 is carried out to the extension section 15.

[0012] A free passage with Space S and the through-hole 14 which exist between the flank of packing 16 and the extension section 15 can be severed by taking such technique.

[0013] thus , permeability be high , and also when the ***** film 21 which consist of a low consistency polyethylene film with low moisture permeability etc. be stick , and the meat theft section 22 be form between the pars basilaris ossis occipitalis 1 a of the body 1 of a container and it be seal by the package bag etc. , it be constitute preferably [at the tip of the ink feed hopper 8 a feed hopper inserted packing 16 and a feed hopper be formed , can damage by insertion / an ink supply needle / , and] so that space may be secure in the interior .

[0014] the winding slots 23, 23, and 23 where an end is open for free passage to the atmospheric-air free passage opening 10 in as shown in drawing 5 (b), and the other end is prolonged in a side besides a lid 11 were formed in the front face of a lid 11, and it was shown in drawing 5 (b) -- as -- the ink inlet 9, the atmospheric-air free passage opening 10, and a slot 23 -- a wrap -- like -- tongue-shaped piece 24a -- tearing off -- the film 24 which enables disconnection of tip 23a of a slot 23 to atmospheric air is stuck. This film 24 has high permeability and it is desirable to use ***** films, such as a low consistency polyethylene film with low moisture permeability.

[0015] The manufacture approach is explained below. Drawing 6 is what shows one example of the pallet for transporting the body of a container among a production process. A pallet 30 The periphery of base 1a of the body 1 of a container implants every four pins 31 and 32 in it, even if the front face each has few ***** locations and insides of opening 1b as for a ***** location. Moreover, the crevice 33 in which this can be held is formed in the location where the ink feed hopper 8 counters, and the level difference section 34 which forms the seal section is formed, and it consists of ink impregnation processes mentioned further later around.

[0016] First, carry out alignment of the opening 1b to a pin 31, and it sets to a pallet 30 so that base 1a may become the upper part about the body 1 (drawing 7 (I)) of a container beforehand formed by injection molding. It presses fit to a predetermined location, carrying out temporary press fit of the packing 16 which applied thinly the adhesives equipped with ink-proof nature at the tip, using it as the ink feed hopper 8 subsequently to centering on a core, stuffing it into it, rotating a fixture 40, and reducing friction (drawing 7 (II)). Thus, if it presses fit giving torsion, since fitting is carried out to the ink feed hopper 8, without turning over edge fields, such as a periphery, and causing a riser and torsion, packing 16 can prevent the elutriation from the ink feed hopper 8 certainly after loading, and packing 16 can fill the crevice between the bodies 1 of a container with adhesives.

[0017] Moreover, after packing 16 is immersed in ink and making ink adhere, it loads like ****. The press member 20 equipped with aperture 20a which can insert in an ink supply needle as mentioned above by making it **** to the lower limit of packing 16, and carrying out heat welding at the body 1 of a container Ink is beforehand poured into the space 20 (drawing 4) into which ink cannot advance easily like the ink packer who mentions later, and the space and the ink feed hopper 8 between the outside side face of packing 16 and the extension section 15 can be intercepted.

[0018] The ***** film 21 which consists of a heat joining nature ingredient is set so that the ink

feed hopper 8 may be covered, the perimeter of the ink feed hopper 8 is heated and pressurized with a fixture 41, and the ink feed hopper 8 is closed with a film 21 (drawing 7 (III)), and if needed, a lot number and an expiration date are printed to base 1a or side-face 1c, or it stamps on them.

[0019] In the phase which all the activities over base 1a of the body 1 of a container ended, the body 1 of a container is re-set to a pallet 30 so that opening 1b of the top-and-bottom return ***** body 1 may become the upper part about the body 1 of a container.

[0020] The tape of filter materials, such as mesh material of stainless steel, and a nonwoven fabric, used as the filter which has larger width of face a little than the width of face of the crevice 13 currently formed in the heights 12 which act as a connoisseur by the ink feed hopper 8 and the vent hole It cuts in predetermined size in the direction of slant to a longitudinal direction, and a filter material 17 is formed, this is set so that a crevice 13 may be covered, with a fixture 42, it heats, extent which the body 1 of a container softens a little after a set is pressurized, and heat welding is carried out (drawing 8 (I)). When the wire of stainless steel is woven and the tape of a filter material 17 is constituted, a fray can be prevented by cutting so that it may become un-parallel to the direction of the wire used as warp and the weft.

[0021] When generating of a fray is made for there to be nothing, there is the following effectiveness. Namely, if the wire which constitutes a filter material 17 infiltrates into the field of packing 16 In case a recording head is equipped with a cartridge, a wire is caught between the ink supply needle of a recording head, and packing 16. Although the problem of originating in this, and airtight maintenance with the ink supply needle of a recording head and a cartridge falling, allowing permeation of the air from the outside, and causing trouble to supply of the ink to a recording head is produced, this problem is certainly avoidable if a fray is lost.

[0022] Moreover, if the plastic surgery approach which carries out the slanting cut of the tape material as mentioned above is taken as compared with the configuration of heights 12 where a filter material 17 is fixed, and the plastic surgery approach of usually piercing and processing a coincidence ***** filter material into circular or an ellipse form with a press, the deployment of tape material other than fray prevention of a wire can be aimed at.

[0023] Subsequently, it moves to the press fit process of a porous body 5. Drawing 9 (b) and (b) show one example of porosity material insertion equipment and a porosity material insertion process, respectively, and porosity material insertion equipment is formed in the shape of a ctenidium, as shown in drawing 9 (b), it is located in the opposite direction between movable compressive member 43 and 43 and this, and consists of press members 44 which can move up and down.

[0024] Compressive member 43 and 43 is moved to the press member 44 side, and the porosity material 5 is compressed so that the width of face becomes smaller than the width of face of the form room 6, until it moves compressive member 43 and 43 horizontally, it inserts the porosity material 5 (drawing 9 (**) I) and the width of face of the outer edge of compressive member 43 and 43 becomes smaller than the inner width of face of the form room 6 (drawing 9 (**) II).

[0025] Subsequently, it moves to the form room 6, the press member 44 between two compressive member 43 and 43 is moved to the body 1 side of a container, and the porosity material 5 is stuffed into the form room 6 from upper limit (drawing 9 (**) III). Subsequently, since the press member 44 is dropped further a little, a container 1 is made to shunt porosity insertion equipment.

[0026] It is set to the form room 6 where the porosity material 5 greatly fabricated a little rather than the volume of the form room 6 by this as shown in drawing 8 (II) is compressed.

[0027] Subsequently, the direction which includes the flat surface of the lid material 11 through a fixture 45 in the flat surface which contains opening 1b while positioning the lid material 11 to opening 1b of the body 1 of a container and pressing the covering device material 11 on the body 1 of a container by the predetermined pressure, or a perpendicular direction -- further -- any of the direction of slant, or the combined direction -- supersonic vibration -- in addition, friction melting of opening 1b of the body 1 of a container and the rear face of the lid material 11 is carried out, and it pastes up (drawing 8 (III)).

[0028] The heating rod 46 heated to the temperature made sufficient for softening the ingredient which constitutes the body 1 of a container and the lid material 11 after joining is made to contact the perimeter of a joint, and the weld flash which injected hot blast from the injection nozzle 47, and was produced by the time of junction is removed (drawing 10).

[0029] Thus, in the phase which the container completed, it moves to an ink impregnation station. Drawing 11 shows one example of an ink injector, and the sign 50 in drawing is a cradle holding a pallet 30, and as an arrow head A shows with the drive which is not illustrated, it is constituted possible [vertical movement]. 51 is a pedestal, it is equipped with penetration opening, and forms a target chamber 53 by the covering device material 52 which mentions a top face for an inferior surface of tongue later by the level difference section 34 of the peripheral surface of a pallet 30 again, and is connected to the vacuum pump 55 by passage 54.

[0030] 52 is the above-mentioned covering device material, a vent hole 56 is drilled in the field which counters a target chamber 53, and holding an airtight condition here, as the drawing Nakaya mark B showed, the piston member 57 which can move up and down is inserted.

[0031] The piston member 57 forms the passage 60 which is open for free passage to the air charging system which is not illustrated so that the impregnation needle 58 and the atmospheric-air free passage opening 10 of a container 1 may be countered in the location which counters the ink inlet 9 of the container 1 set to the target chamber 53, and is constituted. Moreover, the impregnation needle 58 is connected to the branch pipe 62 through passage 59 and a tube 61.

[0032] 63 is a vapor-liquid-separation unit and makes the hollow filament bundle 64 a liquid flow channel in this example -- as -- upper limit and a lower limit -- a cylinder 65 -- liquid -- it is constituted so that negative pressure may be made to act on the periphery of a hollow filament, and a cylinder 65 is connected to a vacuum pump 66, and the end of a cylinder 65 is connected [it fixes densely, and] to the ink tank 68 by the tube 67, and the other end is connected to the branch pipe 62 through the stop valve 69.

[0033] 70 is measuring tubing, it is constituted by a cylinder 71 and the piston 72 and the top dead center side is connected to the branch pipe 62 by the tube 73. In addition, the sign 74 in drawing shows the pump for ink feeding in 75 for a stop valve again, respectively.

[0034] If the pallet 30 which carried the container 1 which attachment of each part material ended according to the above-mentioned process reaches an ink injector and is set under the target chamber 53 (drawing 12 (I)), it will go up until a cradle 50 sticks to the inferior surface of tongue of a pedestal 51 (drawing 12 (II)).

[0035] Subsequently, a stop valve 74 is opened maintaining the stop valve 68 which a piston 56 is dropped to extent which can secure space between the covering device material 11 of a container 1, and is open for free passage to the vapor-liquid-separation unit 63 in the clausilium condition, a vacuum pump 55 is operated, and a target chamber 53, tubes 61 and 73, and the measuring tubing 70 are decompressed to a predetermined pressure (drawing 13 (I)).

[0036] In the phase in which reduced pressure advanced to the predetermined pressure, a stop valve 74 is closed, and a stop valve 68 is opened, the ink 7 of the specified quantity is poured

into the measuring tubing 63 (drawing 13 (II)), and the piston member 57 is dropped to a bottom dead point [this]. Each packing 77 and 78 of the lower limit of the piston member 47 **** by this to the ink feed hopper 10 and the atmospheric-air free passage opening 10 of a container 1, and the impregnation needle 58 advances to near the base of a container 1.

[0037] In this insertion process, if the impregnation needle 58 makes it preferably located in right above [of a filter 17], it can be certainly filled up with ink, without making air bubbles remain to a filter 17, a crevice 13, a through-hole 14, and packing 16. And the porosity material 5 whole can be made to absorb ink equally by forming the ink exhaust nozzle of an ink impregnation needle in a radial.

[0038] Moreover, since the measuring tubing 70 is approached and the vapor-liquid-separation unit 63 is connected, the ink immediately after carrying out degassing in the vapor-liquid-separation unit 63 flows into the measuring tubing 70.

[0039] Subsequently, when a stop valve 74 is opened, the piston of the measuring tubing 70 is pressed and the ink of the specified quantity is discharged in the condition of having closed the stop valve 69 and having intercepted with the vapor-liquid-separation unit 63, the ink of the specified quantity is poured into a container 1 (drawing 14).

[0040] Since the ink degassing was certainly carried out [ink] by the vapor-liquid-separation unit 60 is poured into a porous body 5 at this time, ink is absorbed by the porous body 5 at an above-mentioned reduced pressure process (drawing 13 (I)) at homogeneity, without dissolving easily the gas with which it adsorbs in the pore of the porous body 5 which was not able to be discharged, generating air bubbles or making it remain in the porosity material 5 again.

[0041] the tube 61 which connects the ink impregnation needle 58 with a stop valve 74 especially -- during an ink impregnation period and a room temperature -- temperature -- 10 -- or if it heats so that it may go up about [20 degrees] by C, the viscosity of ink can fall and the pore of a porous body 5 can be made to advance certainly

[0042] Since a gas stops existing in the porosity material 5 at least by this when impregnation of ink is completed, a quality of printed character can be guaranteed excluding air bubbles.

[0043] The porosity material 5 is made to absorb completely the ink which opened the exhaust port 60 wide to atmospheric air, and remained in the upper part of the porosity material 5 in the phase which impregnation of ink ended by differential pressure with atmospheric pressure. Then, drop a cradle 50 and wipe off the ink which was made to move a pallet 40 to the following process, and has adhered to the ink inlet 9 grade with vacuum suction, cloth, etc., and make a conduit contact the ink inlet 9 finally, minute positive pressure is made to act, and it is failed to wipe the ink adhering to the flesh side of a lid 11 to a porous body 5 side.

[0044] A container 1 is leaned so that the atmospheric-air free passage opening 10 may serve as the upper part, and it holds in a reduced pressure container, and tacking of the ***** film 24 cut by the size of wrap extent at least in the atmospheric-air free passage opening 10, the ink inlet 9, and the rill 23 is carried out by heat joining with a fixture 80 (drawing 15). Under the present circumstances, even if the pressure in a container 1 rises by the temperature rise, since the atmospheric-air free passage opening 10 is located up as much as possible, the air which expanded is promptly discharged from the atmospheric-air free passage opening 10, and can prevent leakage of the ink from the ink inlet 9.

[0045] Subsequently, a wrap field is heated for a slot 19 and half one of a film 24 is welded, and the important section of half others is torn off, it welds [possible], and a capillary is formed with a rill 19 and a film 24. If it holds down the reduced pressure value to 200mmHg extent in holding and re-deaerating an ink cartridge to a deaerating chamber, before sticking half others

which is a film 24, a cartridge can be re-decompressed, suppressing physical growth of the generating nucleus of air bubbles which remains near the ink feed hopper rather than the filter 17 produced with packing 16, and jet of the ink from an ink inlet can be suppressed, and an ink cartridge can be filled up with much ink as much as possible.

[0046] Thus, the completed ink cartridge 70 is inserted in the bag 83 with ** 83a constituted with the ***** film, after making shock absorbing material 81 contact the ink feed hopper 8 at least so that the seal 16 of the ink feed hopper 8 may not be damaged at least like as shown in drawing 16 and folding up tongue-shaped piece 24a of the **** film 24.

[0047] And if heat welding is carried out and it seals near the opening under a reduced pressure environment after folding up ** 83a near the opening inside and fabricating in equal thickness (drawing 17 (**)), the meat theft section 22 prepared near the ink feed hopper 8 will form reduced pressure space between bags 83. On the other hand, it will be discharged by the reduced pressure space in which only the air dissolved in the ink near the ink feed hopper penetrated the film 21, and the meat theft section 22 was formed with the bag 83 if the low consistency polyethylene film with low moisture permeability etc. constitutes highly [gas permeability] the film 21 which closes the ink feed hopper 8. The air dissolved degree of the ink near the ink feed hopper can be reduced as much as possible by this, and the inflow of the air bubbles to a recording head can be prevented.

[0048] Moreover, by permeability being high and constituting the film 21 which closes the ink feed hopper 8 and the ink inlet 9 of a lid 11, an exhaust port 10, and the film 24 that closes a slot 23 with ***** films, such as a low consistency polyethylene film with low moisture permeability, the amount of dissolved air of the whole ink of a cartridge can be reduced as much as possible, and generating of the air bubbles in a recording head can be prevented certainly. Desirably, it is desirable after re-degassing to enclose with a bag 83 within 72 hours.

[0049] maintaining the ink of a cartridge to whenever [degassing / of minus 300mmHg extent] on the need of making it dissolving in ink certainly and eliminating the air bubbles in a recording head in filling up a recording head with ink for the first time especially -- ** -- better. Thus, it is desirable, to prepare a crevice and a through-hole in the shock absorbing material 81 of a thick eye, and to enclose a spacer to it, and to close to it in order to form dead space positively between a bag 83 and a cartridge. [enlarging the volume of the meat theft section 22 of a container, in order to make ink maintain whenever / high degassing]

[0050] Finally it dedicates to a case 84 and goods are made (drawing 17 (**)). Since it is the ink cartridge with which the recording head of the recording apparatus concerned is equipped first, as for the ink cartridge enclosed as an accessory of the body of a recording apparatus, it is desirable to choose what was filled up with the ink of whenever [high degassing / which was mentioned above], and for whenever [degassing] to supply an ink cartridge low a little to supplies, and it is constituted so that these two kinds of cartridges can be distinguished easily, and a case 84 can be distinguished by the notation or the color.

[0051] In addition, although the example was taken and explained to the cartridge equipped with the ink room in the above-mentioned example, it is clear that a container 1 is filled up with the porosity material 5 as shown in drawing 18, and it can apply also to manufacture of the cartridge 85 which holds ink only in this porosity material 5.

[0052] Moreover, although only one opening 87 which is in the small cartridge 86 and makes an ink inlet and an atmospheric-air clear aperture serve a double purpose is formed as shown in **** 19, one opening 87 of a cartridge 85 can be used for an ink impregnation activity and an exhaust air activity at coincidence by arranging the ink impregnation needle 58 and the passage

60 which is open for free passage to an exhauster on the same axle, as shown at drawing 20 in such a case.

[0053]

[Effect of the Invention] The body of a container with which it had the form room in which the porous body which consists of a spring material which was suitable for absorbing ink in this invention is held as explained above, and the ink feed hopper which engages with the ink supply needle of a recording head was prepared in the lower limit of a form room, It is formed in the equipped with ink inlet which closes opening of body of container lid, and porous body side of a form room. The heights which it has the crevice where the filter material was stuck at the tip, and the through-hole prolonged from a crevice to an ink feed hopper is drilled, and compress a porous body in cooperation with a lid, In the ink cartridge which consists of packing fitted in the limb formed in the outer edge of a through-hole, and a film which closes an ink feed hopper, since the thin ring-like rib formed in the top face of packing The space of a through-hole and the lateral part of packing can be intercepted certainly, and generating of the air bubbles near the ink feed hopper can be prevented certainly.

[0054] Moreover, it has the form room in which the porous body which consists of a spring material which absorbs ink at least in this invention is held. The process to which the ink feed hopper was formed in the base and opening of the upper part was carried out further and which is set to a pallet so that the body of a container of a rectangular parallelepiped may be prepared mostly and a base may be made into the upper part, The process which inserts packing in an ink feed hopper and carries out heat welding of the film for the closures at an ink feed hopper, The process which is made to carry out vertical reversal of the body of a container, and is re-set to a pallet, and the process which fixes a filter material to the input side which is open for free passage to an ink feed hopper, The porosity material press fit process which inserts porosity material in a form room so that it may be in a compression condition, An ink inlet, atmospheric-air free passage opening, and the lid material adhesion process that pastes up the lid material by which the rill linked to atmospheric-air free passage opening was formed in the front face on opening of the body of a container, and forms a container, Since it had the ink impregnation process of holding a container in the bottom of a reduced pressure environment, and pouring the ink of the amount of conventions into a form room, and the closure process of the front face of lid material which pastes up a ***** film so that said ink inlet and the field of a rill may be covered at least By transporting a pallet to each process, it can manufacture efficiently.

TECHNICAL FIELD

[The field of the technique in which invention belongs] This invention carries an ink jet type recording head and an ink cartridge in carriage, and relates to the ink cartridge of an ink jet type recording apparatus which supplies ink by exchange of a cartridge.

PRIOR ART

[Description of the Prior Art] If it is in the ink jet printer of the format of carrying an ink hold object in the carriage which carried the ink jet type recording head, In order to prevent fluctuation of the head resulting from rocking of the ink by migration of carriage, and poor printing by foaming, what divides an ink hold container into two fields as indicated by the

Europe public presentation patent official report No. 581531 official report, holds a porous body in a recording head side, and held ink in the field of another side is proposed. If such structure is taken, since supply of the ink to a recording head will be performed through a porous body, it can prevent un-arranging resulting from rocking of ink.

EFFECT OF THE INVENTION

[Effect of the Invention] The body of a container with which it had the form room in which the porous body which consists of a spring material which was suitable for absorbing ink in this invention is held as explained above, and the ink feed hopper which engages with the ink supply needle of a recording head was prepared in the lower limit of a form room, It is formed in the equipped with ink inlet which closes opening of body of container lid, and porous body side of a form room. The heights which it has the crevice where the filter material was stuck at the tip, and the through-hole prolonged from a crevice to an ink feed hopper is drilled, and compress a porous body in cooperation with a lid, The thin ring-like rib formed in the top face of packing in the ink cartridge which consists of packing fitted in the limb formed in the outer edge of a through-hole, and a film which closes an ink feed hopper. Therefore, the space of a through-hole and the lateral part of packing can be intercepted certainly, and generating of the air bubbles near the ink feed hopper can be prevented certainly.

[0054] Moreover, it has the form room in which the porous body which consists of a spring material which absorbs ink at least in this invention is held. The process to which the ink feed hopper was formed in the base and opening of the upper part was carried out further and which is set to a pallet so that the body of a container of a rectangular parallelepiped may be prepared mostly and a base may be made into the upper part, The process which inserts packing in an ink feed hopper and carries out heat welding of the film for the closures at an ink feed hopper, The process which is made to carry out vertical reversal of the body of a container, and is re-set to a pallet, and the process which fixes a filter material to the input side which is open for free passage to an ink feed hopper, The porosity material press fit process which inserts porosity material in a form room so that it may be in a compression condition, An ink inlet, atmospheric-air free passage opening, and the lid material adhesion process that pastes up the lid material by which the rill linked to atmospheric-air free passage opening was formed in the front face on opening of the body of a container, and forms a container, It had the ink impregnation process of holding a container in the bottom of a reduced pressure environment, and pouring the ink of the amount of conventions into a form room, and the closure process of the front face of lid material which pastes up a ***** film so that said ink inlet and the field of a rill may be covered at least. Therefore, it can manufacture efficiently by transporting a pallet to each process.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, on the relation which an ink jet type recording device pressurizes [relation] the ink of a pressure generating room, and generates an ink droplet, if air bubbles are contained in ink, since a pressure will decline and the discharging performance of an ink droplet will also fall, pouring into a porous body the ink which eliminated dissolved air is performed. Although packing which consists of an elastic member is fitted in by the ink feed hopper on the other hand in order to maintain airtightness and to secure connection with a recording head, minute space exists between packing and a cartridge body, and there is a

problem of the air of this space expanding, flowing into a recording head, and causing un-arranging to the ink regurgitation. The 1st purpose of this invention is offering the ink cartridge of the ink jet type recording apparatus which can eliminate certainly the air which remains in an ink feed hopper.

[0004] On the other hand, without making ink generate air bubbles until a recording head is loaded, the package for maintaining a degassing condition moreover and guaranteeing the quality in a circulation process etc. becomes indispensable, and such an ink cartridge has the problem that need a complicated production process and productivity falls. The 2nd purpose of this invention is proposing the manufacture approach for manufacturing efficiently the ink cartridge filled up with the ink by which degassing's was carried out certainly.

MEANS

[Means for Solving the Problem] In order to solve such a problem, it sets to this invention. The body of a container with which it had the form room in which the porous body which consists of a spring material suitable for absorbing ink is held, and the ink feed hopper which engages with the ink supply needle of a recording head was prepared in the lower limit of a form room, It is formed in said equipped with ink inlet which closes opening of said body of container lid, and porous body side of said form room. The heights which it has the crevice where the filter material was stuck at the tip, and the through-hole prolonged from said crevice to said ink feed hopper is drilled, and compress said porous body in cooperation with said lid, In the ink cartridge which consists of packing fitted in the limb formed in the outer edge of said through-hole, and a film which closes said ink feed hopper, a thin ring-like rib forms in a top face, and packing intercepts the space of a through-hole and the lateral part of packing certainly.

[0006]

[Embodiment of the Invention] what hold cyanogen , a Magenta , and three kinds of ink of yellow for one example of the target ink cartridge [drawing 1 / approach / of this invention / manufacture] be show , an opening side carry out injection molding of the polymeric materials , such as polypropylene , polyethylene , and polystyrene , in order [which serve as breadth at last a little] to make junction to each part material easy to be the body of a container of a rectangular parallelepiped mostly , and for heat joining to perform , and the sign 1 in drawing be constitute .

[0007] The body 1 of a container is separated into the form rooms 6, 6, and 6 in which the porous body 5 which consists of a spring material suitable for absorbing ink is held, and the ink rooms 7, 7, and 7 in which ink is held as it is from diaphragms 2, 3, and 4.

[0008] The ink feed hopper 8 which engages with the ink supply needle of a recording head is formed in the lower limit of each form room 6, and the closure of the opening of the body 1 of a container is carried out with the lid 11 equipped with the ink inlets 9, 9, and 9 drilled so that it might be located near the ink feed hopper 8 of the form room 6, and the atmospheric-air free passage openings 10, 10, and 10.

[0009] The crevice 13 which the heights 12 for compressing a porous body 5 in cooperation with a lid 11 are formed, and forms the vacant room which has a fixed opening area in that upper limit is formed in the pars basilaris ossis occipitalis of each form room 6, and the through-hole 14 prolonged from this crevice 13 to the ink feed hopper 8 is drilled in it. the outer edge of a through-hole 14 -- the ink supply needle of a recording head, and liquid -- a limb 15 is formed so that it may be engaged densely, and packing 16 inserts -- having -- **** -- moreover -- the tip of heights 12 -- a crevice 13 -- a wrap -- the filter material 17 is stuck like.

[0010] Processing which these filter materials 18, a crevice 12, and the field that touches the ink of a through-hole 14 irradiate ultraviolet rays, and improves the wettability to ink is performed.

[0011] Moreover, thin ring-like rib 16b is formed and packing 16 is constituted by field 16a, as shown in drawing 3, and it is loaded with it so that the adhesives 19 which equipped top-face 16a by the side of heights 12 with ink-proof nature as shown in drawing 4 (b) may be applied and the space S between the bodies 1 of a container may be filled completely. Moreover, packing 16 is inserted where it makes the press member 20 equipped with aperture 20a which can insert in an ink supply needle **** to the lower limit of packing 16, and heat joining is carried out to the body 1 of a container, as shown in this drawing (b), and elastic deformation of the rib 16b of packing 16 is carried out to the extension section 15.

[0012] A free passage with Space S and the through-hole 14 which exist between the flank of packing 16 and the extension section 15 can be severed by taking such technique.

[0013] thus, permeability be high, and also when the ***** film 21 which consist of a low consistency polyethylene film with low moisture permeability etc. be stick, and the meat theft section 22 be form between the pars basilaris ossis occipitalis 1 a of the body 1 of a container and it be seal by the package bag etc., it be constitute preferably [at the tip of the ink feed hopper 8 a feed hopper inserted packing 16 and a feed hopper be formed, can damage by insertion / an ink supply needle /, and] so that space may be secure in the interior.

[0014] the winding slots 23, 23, and 23 where an end is open for free passage to the atmospheric-air free passage opening 10 in as shown in drawing 5 (b), and the other end is prolonged in a side besides a lid 11 were formed in the front face of a lid 11, and it was shown in drawing 5 (b) -- as -- the ink inlet 9, the atmospheric-air free passage opening 10, and a slot 23 -- a wrap -- like -- tongue-shaped piece 24a -- tearing off -- the film 24 which enables disconnection of tip 23a of a slot 23 to atmospheric air is stuck. This film 24 has high permeability and it is desirable to use ***** films, such as a low consistency polyethylene film with low moisture permeability.

[0015] The manufacture approach is explained below. Drawing 6 is what shows one example of the pallet for transporting the body of a container among a production process. A pallet 30 The periphery of base 1a of the body 1 of a container implants every four pins 31 and 32 in it, even if the front face each has few ***** locations and insides of opening 1b as for a ***** location. Moreover, the crevice 33 in which this can be held is formed in the location where the ink feed hopper 8 counters, and the level difference section 34 which forms the seal section is formed, and it consists of ink impregnation processes mentioned further later around.

[0016] First, carry out alignment of the opening 1b to a pin 31, and it sets to a pallet 30 so that base 1a may become the upper part about the body 1 (drawing 7 (I)) of a container beforehand formed by injection molding. It presses fit to a predetermined location, carrying out temporary press fit of the packing 16 which applied thinly the adhesives equipped with ink-proof nature at the tip, using it as the ink feed hopper 8 subsequently to centering on a core, stuffing it into it, rotating a fixture 40, and reducing friction (drawing 7 (II)). Thus, if it presses fit giving torsion, since fitting is carried out to the ink feed hopper 8, without turning over edge fields, such as a periphery, and causing a riser and torsion, packing 16 can prevent the elutriation from the ink feed hopper 8 certainly after loading, and packing 16 can fill the crevice between the bodies 1 of a container with adhesives.

[0017] Moreover, after packing 16 is immersed in ink and making ink adhere, it loads like ****. The press member 20 equipped with aperture 20a which can insert in an ink supply needle as mentioned above by making it **** to the lower limit of packing 16, and carrying out heat welding at the body 1 of a container Ink is beforehand poured into the space 20 (drawing 4) into

which ink cannot advance easily like the ink packer who mentions later, and the space and the ink feed hopper 8 between the outside side face of packing 16 and the extension section 15 can be intercepted.

[0018] The ***** film 21 which consists of a heat joining nature ingredient is set so that the ink feed hopper 8 may be covered, the perimeter of the ink feed hopper 8 is heated and pressurized with a fixture 41, and the ink feed hopper 8 is closed with a film 21 (drawing 7 (III)), and if needed, a lot number and an expiration date are printed to base 1a or side-face 1c, or it stamps on them.

[0019] In the phase which all the activities over base 1a of the body 1 of a container ended, the body 1 of a container is re-set to a pallet 30 so that opening 1b of the top-and-bottom return ***** body 1 may become the upper part about the body 1 of a container.

[0020] The tape of filter materials, such as mesh material of stainless steel, and a nonwoven fabric, used as the filter which has larger width of face a little than the width of face of the crevice 13 currently formed in the heights 12 which act as a connoisseur by the ink feed hopper 8 and the vent hole It cuts in predetermined size in the direction of slant to a longitudinal direction, and a filter material 17 is formed, this is set so that a crevice 13 may be covered, with a fixture 42, it heats, extent which the body 1 of a container softens a little after a set is pressurized, and heat welding is carried out (drawing 8 (I)). When the wire of stainless steel is woven and the tape of a filter material 17 is constituted, a fray can be prevented by cutting so that it may become un-parallel to the direction of the wire used as warp and the weft.

[0021] When generating of a fray is made for there to be nothing, there is the following effectiveness. Namely, if the wire which constitutes a filter material 17 infiltrates into the field of packing 16 In case a recording head is equipped with a cartridge, a wire is caught between the ink supply needle of a recording head, and packing 16. Although the problem of originating in this, and airtight maintenance with the ink supply needle of a recording head and a cartridge falling, allowing permeation of the air from the outside, and causing trouble to supply of the ink to a recording head is produced, this problem is certainly avoidable if a fray is lost.

[0022] Moreover, if the plastic surgery approach which carries out the slanting cut of the tape material as mentioned above is taken as compared with the configuration of heights 12 where a filter material 17 is fixed, and the plastic surgery approach of usually piercing and processing a coincidence ***** filter material into circular or an ellipse form with a press, the deployment of tape material other than fray prevention of a wire can be aimed at.

[0023] Subsequently, it moves to the press fit process of a porous body 5. Drawing 9 (b) and (b) show one example of porosity material insertion equipment and a porosity material insertion process, respectively, and porosity material insertion equipment is formed in the shape of a ctenidium, as shown in drawing 9 (b), it is located in the opposite direction between movable compressive member 43 and 43 and this, and consists of press members 44 which can move up and down.

[0024] Compressive member 43 and 43 is moved to the press member 44 side, and the porosity material 5 is compressed so that the width of face becomes smaller than the width of face of the form room 6, until it moves compressive member 43 and 43 horizontally, it inserts the porosity material 5 (drawing 9 (**) I) and the width of face of the outer edge of compressive member 43 and 43 becomes smaller than the inner width of face of the form room 6 (drawing 9 (**) II).

[0025] Subsequently, it moves to the form room 6, the press member 44 between two compressive member 43 and 43 is moved to the body 1 side of a container, and the porosity material 5 is stuffed into the form room 6 from upper limit (drawing 9 (**) III). Subsequently,

since the press member 44 is dropped further a little, a container 1 is made to shunt porosity insertion equipment.

[0026] It is set to the form room 6 where the porosity material 5 greatly fabricated a little rather than the volume of the form room 6 by this as shown in drawing 8 (II) is compressed.

[0027] Subsequently, the direction which includes the flat surface of the lid material 11 through a fixture 45 in the flat surface which contains opening 1b while positioning the lid material 11 to opening 1b of the body 1 of a container and pressing the covering device material 11 on the body 1 of a container by the predetermined pressure, or a perpendicular direction -- further -- any of the direction of slant, or the combined direction -- supersonic vibration -- in addition, friction melting of opening 1b of the body 1 of a container and the rear face of the lid material 11 is carried out, and it pastes up (drawing 8 (III)).

[0028] The heating rod 46 heated to the temperature made sufficient for softening the ingredient which constitutes the body 1 of a container and the lid material 11 after joining is made to contact the perimeter of a joint, and the weld flash which injected hot blast from the injection nozzle 47, and was produced by the time of junction is removed (drawing 10).

[0029] Thus, in the phase which the container completed, it moves to an ink impregnation station. Drawing 11 shows one example of an ink injector, and the sign 50 in drawing is a cradle holding a pallet 30, and as an arrow head A shows with the drive which is not illustrated, it is constituted possible [vertical movement]. 51 is a pedestal, it is equipped with penetration opening, and forms a target chamber 53 by the covering device material 52 which mentions a top face for an inferior surface of tongue later by the level difference section 34 of the peripheral surface of a pallet 30 again, and is connected to the vacuum pump 55 by passage 54.

[0030] 52 is the above-mentioned covering device material, a vent hole 56 is drilled in the field which counters a target chamber 53, and holding an airtight condition here, as the drawing Nakaya mark B showed, the piston member 57 which can move up and down is inserted.

[0031] The piston member 57 forms the passage 60 which is open for free passage to the air charging system which is not illustrated so that the impregnation needle 58 and the atmospheric-air free passage opening 10 of a container 1 may be countered in the location which counters the ink inlet 9 of the container 1 set to the target chamber 53, and is constituted. Moreover, the impregnation needle 58 is connected to the branch pipe 62 through passage 59 and a tube 61.

[0032] 63 is a vapor-liquid-separation unit and makes the hollow filament bundle 64 a liquid flow channel in this example -- as -- upper limit and a lower limit -- a cylinder 65 -- liquid -- it is constituted so that negative pressure may be made to act on the periphery of a hollow filament, and a cylinder 65 is connected to a vacuum pump 66, and the end of a cylinder 65 is connected [it fixes densely, and] to the ink tank 68 by the tube 67, and the other end is connected to the branch pipe 62 through the stop valve 69.

[0033] 70 is measuring tubing, it is constituted by a cylinder 71 and the piston 72 and the top dead center side is connected to the branch pipe 62 by the tube 73. In addition, the sign 74 in drawing shows the pump for ink feeding in 75 for a stop valve again, respectively.

[0034] If the pallet 30 which carried the container 1 which attachment of each part material ended according to the above-mentioned process reaches an ink injector and is set under the target chamber 53 (drawing 12 (I)), it will go up until a cradle 50 sticks to the inferior surface of tongue of a pedestal 51 (drawing 12 (II)).

[0035] Subsequently, a stop valve 74 is opened maintaining the stop valve 68 which a piston 56 is dropped to extent which can secure space between the covering device material 11 of a container 1, and is open for free passage to the vapor-liquid-separation unit 63 in the clausilium

condition, a vacuum pump 55 is operated, and a target chamber 53, tubes 61 and 73, and the measuring tubing 70 are decompressed to a predetermined pressure (drawing 13 (I)).

[0036] In the phase in which reduced pressure advanced to the predetermined pressure, a stop valve 74 is closed, and a stop valve 68 is opened, the ink 7 of the specified quantity is poured into the measuring tubing 63 (drawing 13 (II)), and the piston member 57 is dropped to a bottom dead point [this]. Each packing 77 and 78 of the lower limit of the piston member 47 **** by this to the ink feed hopper 10 and the atmospheric-air free passage opening 10 of a container 1, and the impregnation needle 58 advances to near the base of a container 1.

[0037] In this insertion process, if the impregnation needle 58 makes it preferably located in right above [of a filter 17], it can be certainly filled up with ink, without making air bubbles remain to a filter 17, a crevice 13, a through-hole 14, and packing 16. And the porosity material 5 whole can be made to absorb ink equally by forming the ink exhaust nozzle of an ink impregnation needle in a radial.

[0038] Moreover, since the measuring tubing 70 is approached and the vapor-liquid-separation unit 63 is connected, the ink immediately after carrying out degassing in the vapor-liquid-separation unit 63 flows into the measuring tubing 70.

[0039] Subsequently, when a stop valve 74 is opened, the piston of the measuring tubing 70 is pressed and the ink of the specified quantity is discharged in the condition of having closed the stop valve 69 and having intercepted with the vapor-liquid-separation unit 63, the ink of the specified quantity is poured into a container 1 (drawing 14).

[0040] Since the ink degassing was certainly carried out [ink] by the vapor-liquid-separation unit 60 is poured into a porous body 5 at this time, ink is absorbed by the porous body 5 at an above-mentioned reduced pressure process (drawing 13 (I)) at homogeneity, without dissolving easily the gas with which it adsorbs in the pore of the porous body 5 which was not able to be discharged, generating air bubbles or making it remain in the porosity material 5 again.

[0041] the tube 61 which connects the ink impregnation needle 58 with a stop valve 74 especially -- during an ink impregnation period and a room temperature -- temperature -- 10 -- or if it heats so that it may go up about [20 degrees] by C, the viscosity of ink can fall and the pore of a porous body 5 can be made to advance certainly

[0042] Since a gas stops existing in the porosity material 5 at least by this when impregnation of ink is completed, a quality of printed character can be guaranteed excluding air bubbles.

[0043] The porosity material 5 is made to absorb completely the ink which opened the exhaust port 60 wide to atmospheric air, and remained in the upper part of the porosity material 5 in the phase which impregnation of ink ended by differential pressure with atmospheric pressure. Then, drop a cradle 50 and wipe off the ink which was made to move a pallet 40 to the following process, and has adhered to the ink inlet 9 grade with vacuum suction, cloth, etc., and make a conduit contact the ink inlet 9 finally, minute positive pressure is made to act, and it is failed to wipe the ink adhering to the flesh side of a lid 11 to a porous body 5 side.

[0044] A container 1 is leaned so that the atmospheric-air free passage opening 10 may serve as the upper part, and it holds in a reduced pressure container, and tacking of the ***** film 24 cut by the size of wrap extent at least in the atmospheric-air free passage opening 10, the ink inlet 9, and the rill 23 is carried out by heat joining with a fixture 80 (drawing 15). Under the present circumstances, even if the pressure in a container 1 rises by the temperature rise, since the atmospheric-air free passage opening 10 is located up as much as possible, the air which expanded is promptly discharged from the atmospheric-air free passage opening 10, and can prevent leakage of the ink from the ink inlet 9.

[0045] Subsequently, a wrap field is heated for a slot 19 and half one of a film 24 is welded, and the important section of half others is torn off, it welds [possible], and a capillary is formed with a rill 19 and a film 24. If it holds down the reduced pressure value to 200mmHg extent in holding and re-deaerating an ink cartridge to a deaerating chamber, before sticking half others which is a film 24, a cartridge can be re-decompressed, suppressing physical growth of the generating nucleus of air bubbles which remains near the ink feed hopper rather than the filter 17 produced with packing 16, and jet of the ink from an ink inlet can be suppressed, and an ink cartridge can be filled up with much ink as much as possible.

[0046] Thus, the completed ink cartridge 70 is inserted in the bag 83 with ** 83a constituted with the ***** film, after making shock absorbing material 81 contact the ink feed hopper 8 at least so that the seal 16 of the ink feed hopper 8 may not be damaged at least like as shown in drawing 16 and folding up tongue-shaped piece 24a of the **** film 24.

[0047] And if heat welding is carried out and it seals near the opening under a reduced pressure environment after folding up ** 83a near the opening inside and fabricating in equal thickness (drawing 17 (**)), the meat theft section 22 prepared near the ink feed hopper 8 will form reduced pressure space between bags 83. On the other hand, it will be discharged by the reduced pressure space in which only the air dissolved in the ink near the ink feed hopper penetrated the film 21, and the meat theft section 22 was formed with the bag 83 if the low consistency polyethylene film with low moisture permeability etc. constitutes highly [gas permeability] the film 21 which closes the ink feed hopper 8. The air dissolved degree of the ink near the ink feed hopper can be reduced as much as possible by this, and the inflow of the air bubbles to a recording head can be prevented.

[0048] Moreover, by permeability being high and constituting the film 21 which closes the ink feed hopper 8 and the ink inlet 9 of a lid 11, an exhaust port 10, and the film 24 that closes a slot 23 with ***** films, such as a low consistency polyethylene film with low moisture permeability, the amount of dissolved air of the whole ink of a cartridge can be reduced as much as possible, and generating of the air bubbles in a recording head can be prevented certainly. Desirably, it is desirable after re-degassing to enclose with a bag 83 within 72 hours.

[0049] maintaining the ink of a cartridge to whenever [degassing / of minus 300mmHg extent] on the need of making it dissolving in ink certainly and eliminating the air bubbles in a recording head in filling up a recording head with ink for the first time especially -- ** -- better. Thus, it is desirable, to prepare a crevice and a through-hole in the shock absorbing material 81 of a thick eye, and to enclose a spacer to it, and to close to it in order to form dead space positively between a bag 83 and a cartridge. [enlarging the volume of the meat theft section 22 of a container, in order to make ink maintain whenever / high degassing]

[0050] Finally it dedicates to a case 84 and goods are made (drawing 17 (**)). Since it is the ink cartridge with which the recording head of the recording apparatus concerned is equipped first, as for the ink cartridge enclosed as an accessory of the body of a recording apparatus, it is desirable to choose what was filled up with the ink of whenever [high degassing / which was mentioned above], and for whenever [degassing] to supply an ink cartridge low a little to supplies, and it is constituted so that these two kinds of cartridges can be distinguished easily, and a case 84 can be distinguished by the notation or the color.

[0051] In addition, although the example was taken and explained to the cartridge equipped with the ink room in the above-mentioned example, it is clear that a container 1 is filled up with the porosity material 5 as shown in drawing 18 , and it can apply also to manufacture of the cartridge 85 which holds ink only in this porosity material 5.

[0052] Moreover, although only one opening 87 which is in the small cartridge 86 and makes an ink inlet and an atmospheric-air clear aperture serve a double purpose is formed as shown in ****19, one opening 87 of a cartridge 85 can be used for an ink impregnation activity and an exhaust air activity at coincidence by arranging the ink impregnation needle 58 and the passage 60 which is open for free passage to an exhauster on the same axle, as shown at drawing 20 in such a case.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the assembly perspective view showing one example of an ink cartridge set as the object of this invention.

[Drawing 2] Drawing (b) and (b) are the sectional views showing one example of an ink cartridge same as the above, respectively.

[Drawing 3] Drawing (b) and (b) are the plans and sectional views showing one example to packing, respectively.

[Drawing 4] Drawing (b) and (b) are the sectional views expanding and showing one example of an ink feed hopper, respectively.

[Drawing 5] Drawing (b) and (b) are drawing in which removing a film and showing the structure of the lid of an ink cartridge, and drawing shown where a film is stuck, respectively.

[Drawing 6] It is drawing showing one example of the pallet which holds and conveys a container.

[Drawing 7] Drawing (I), (II), and (III) are drawings showing the process of the first stage of the ink cartridge formation processes, respectively.

[Drawing 8] Drawing (I), (II), and (III) are drawings showing the process of the middle of the ink cartridge formation processes, respectively.

[Drawing 9] Drawing (**) is (I) thru/or (III) drawing showing the insertion process to the body of a container of porosity material, respectively of one example of porosity material insertion equipment, and drawing (**).

[Drawing 10] It is drawing showing the plastic surgery process of the appearance configuration of a cartridge.

[Drawing 11] It is the block diagram showing one example of an ink injector.

[Drawing 12] Drawing (I) and (II) are drawings showing the process of the first stage of the ink impregnation processes, respectively.

[Drawing 13] Drawing (I) and (II) are drawings showing the process of the middle of the ink impregnation processes, respectively.

[Drawing 14] It is drawing showing the process of the last of an ink impregnation process.

[Drawing 15] It is drawing showing the attachment process of a ***** film.

[Drawing 16] It is drawing showing the process of the first half of the packaging processes.

[Drawing 17] It is drawing showing the process of the second half of the packaging processes.

[Drawing 18] It is drawing showing other examples of the ink cartridge which can apply the manufacture approach of this invention.

[Drawing 19] It is drawing showing other examples of the ink cartridge which can apply the manufacture approach of this invention.

[Drawing 20] It is drawing showing other examples of the ink injector suitable for an ink cartridge same as the above.

[Description of Notations]

1 Body of Container
5 Porous Body
6 Form Room
7 Ink Room
8 Ink Feed Hopper
9 Ink Inlet
10 Atmospheric-Air Free Passage Opening
11 Lid Material
16 Packing
16b Ring-like rib
S Space

CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law

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[Procedure amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] Claim

[Method of Amendment] Modification

[Proposed Amendment]

[Claim(s)]

[Claim 1] In the ink cartridge equipped with the ink hold field in which ink is held and said ink hold field, and the ink feed hopper open for free passage,

The ink cartridge for ink jet type recording apparatus by which the ring-like rib is formed in said ink hold field of said packing, and the front face of a side open for free passage, and said ink feed hopper is loaded with said packing in the outside surface of said packing, and the condition of having made said rib contacting the inside of said ink feed hopper.

[Claim 2] The ink cartridge for ink jet type recording apparatus according to claim 1 by which

said ink feed hopper is loaded with said packing through the layer of adhesives equipped with ink-proof nature.

[Claim 3] The ink cartridge for ink jet type recording apparatus according to claim 1 currently fixed to said ink feed hopper by the press member which said packing equipped with the aperture which can insert in said ink supply needle so that elastic deformation of said rib might be carried out to the inside of said ink feed hopper.

[Claim 4] In the ink cartridge equipped with the ink hold field in which ink is held and said ink hold field, and the ink feed hopper open for free passage,

The ink cartridge for ink jet type recording apparatus currently packed with the ***** film in the state of reduced pressure so that permeability may be high, the closure may be carried out with a low consistency polyethylene film with low moisture permeability and opening of said ink feed hopper may form space between said ink cartridges.

[Claim 5] The ink cartridge for ink jet type recording apparatus according to claim 4 currently formed of the meat theft section by which said space was established in the body of a container which constitutes said ink cartridge.

[Procedure amendment 2]

[Document to be Amended] Specification

[Item(s) to be Amended] 0005

[Method of Amendment] Modification

[Proposed Amendment]

[0005]

[Means for Solving the Problem] In order to solve such a problem, the ring-like rib is formed in the front face of the side which is open for free passage with said ink hold field of said packing in the ink hold field in which ink is held in this invention and said ink hold field, and the ink cartridge equipped with the ink feed hopper open for free passage, and said ink feed hopper is loaded with said packing in the outside surface of said packing, and the condition of having made said rib contacting the inside of said ink feed hopper.

[Procedure amendment 3]

[Document to be Amended] Specification

[Item(s) to be Amended] 0053

[Method of Amendment] Modification

[Proposed Amendment]

[0053]

[Effect of the Invention] Since according to this invention packing contacts the inside of an ink feed hopper in the outside surface and rib and forms an airtight structure as explained above, generating of the air bubbles near the ink feed hopper can be prevented certainly.

[Translation done.]